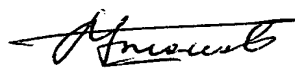




ABSTRACT

A method of gas analysis and an ionization detector for its implementation provide a qualitative and quantitative analysis of impurities in a main (buffer) gas. The detector can operate in a wide range of gas pressures, up to atmospheric one. The identification of impurities is provided by analyzing the energy of electrons produced by the ionization of the impurity atoms or molecules in their collisions with long living atoms of a buffer gas or with monochromatic photons. The energy analysis of electrons produced in the collisions of impurities with metastable atoms in the afterglow plasma ignited between two plane electrodes is performed by determining the second derivative of electric current dependence on the voltage applied between the anode and the cathode. The electron energy can also be analyzed by positioning a grid between the anode and the cathode and by using an external ultraviolet radiation source to ionize the impurities in the equipotential space between the grid and the anode. The inter-electrode gap and the gas pressure are chosen in such a way that the distortions in the electron energy measurement due to the collisions with the gas atoms or molecules should not exceed a prescribed value.

*Translated to best
of my knowledge*

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/ Alexander Tsyganov